

September In Review

...and then some





2020 SEPTEMBER

SUN

MON

TUE

WED

THU

FRI

SAT

1

2

SSAS
Virtual
Meeting

3

4

5

6

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Imaging imaging imaging imaging imaging imaging...

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19

...Smoky Skies...



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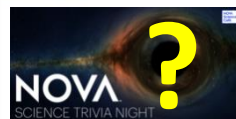
IAD/
InOMN
2020

27

28

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30



South Shore Astronomical Society

Since 1958

Observing Objectives – September '20



A sampling of some rewarding night-sky treats for this month:

Open Cluster – NGC 7789, Caroline's Rose cluster in Cassiopeia.

Globular Cluster – M15 in Pegasus. 12 billion years old and houses PN *Pease 1*.

Double Star – Almach (Gamma Andromedae) Striking color contrast.

Planetary Nebula – NGC 7009, the Saturn nebula in Aquarius.

Galaxy – NGC 404, Mirach's Ghost in a dwarf lenticular galaxy in Andromeda.

Comets – No recommendations this month.

Mercury – Low-angle eastern elongation this month, tough to observe.

Venus – Continues its march towards the Sun, approaches Regulus end of month.

Mars – grows to 22.4" by month's end, culminates at nearly 55* above horizon.

Jupiter – Channel Galileo this month – draw the moons!

Saturn – Take the Saturnian Satellite Challenge – can you get 5?

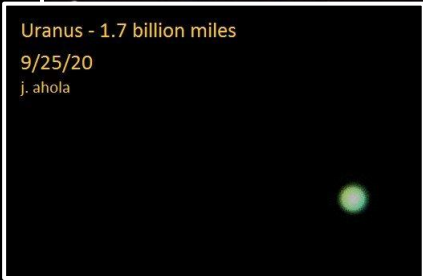
By Day: The Sun – rising from its slumber of minima lately, maybe.

Notable Dates: Full Moon – 9/2 New Moon – 9/17 Equinox – 9/22



(3) Galaxies NGC-891, NGC-7331, and NGC-7640 - taken on 9/21/2020

- CB, 1260mm
- ZWO ASI294MC (uncooled)
- 45x60s, darks and flats
- Post Processed in PixInsight



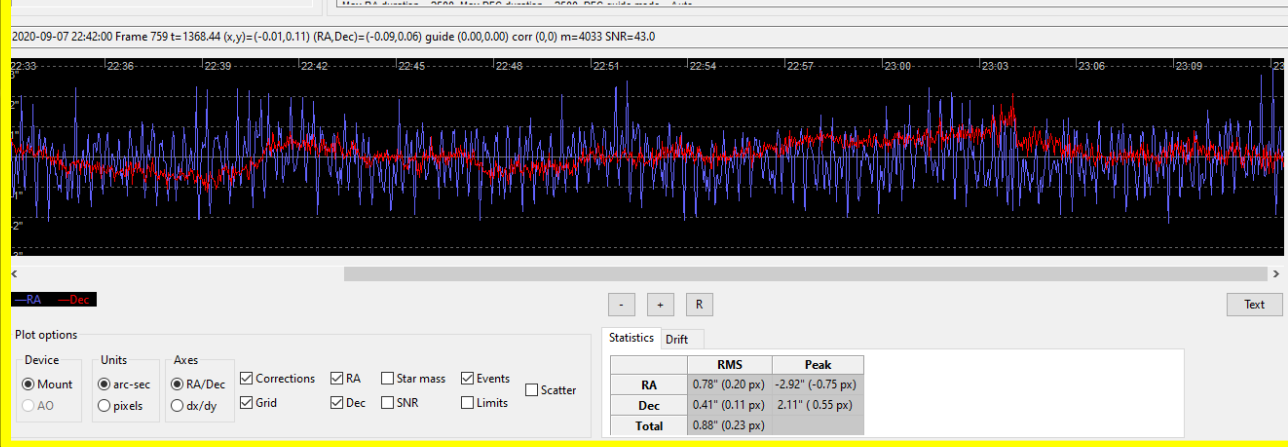
Speaking Astronomical Autoguiding

PHD2 Log Viewer - PHD2_GuideLog_20

File Help

Log sections

1	2020-09-07 21:23:50	Calibration	
2	2020-09-07 21:24:33	Guiding	23m
3	2020-09-07 22:19:12	Guiding	53m



Controls

Align Frames

FWHM Filter

Brightness Filter

Auto Save on Clear/C

Raw Frames

View

Stacking

minutes total exposure

Settings

Trendlines

Corrections

RA Dec

RMS Error [px]:

RA 0.16 (0.62")

Dec 0.07 (0.27")

Tot 0.17 (0.67")

RA Osc: 0.23

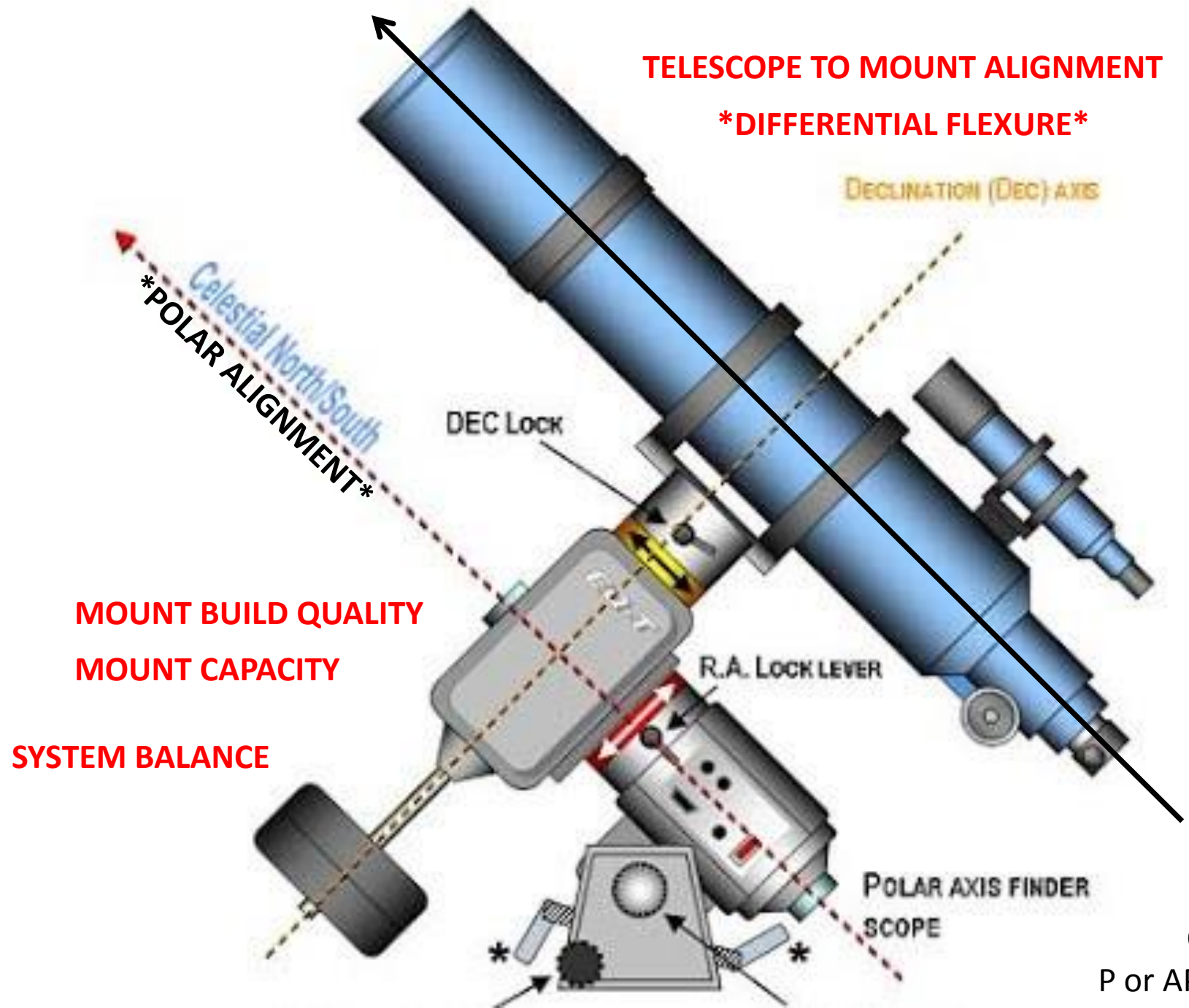
RA: Agr 70 Hys 10 MnMo 0.19 DEC: Agr 100 MnMo 0.19

Scope: Mx RA 2500 Mx DEC 2500 Auto

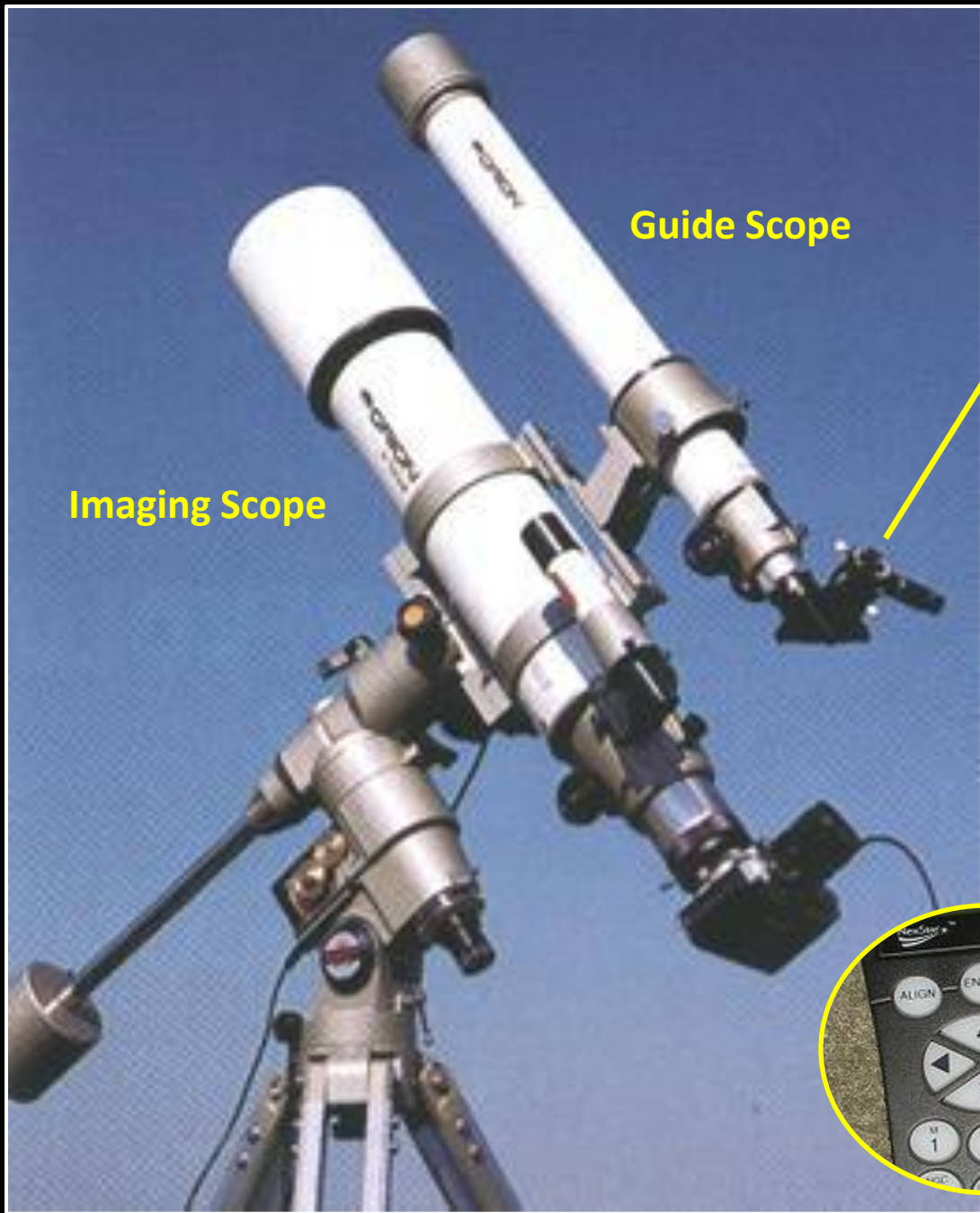
1.0 s

Guiding

SNR 43.3 → 136 ms, 0.5 px



C-AVX <1k
 P or AP – 17-20k



Imaging Scope

Guide Scope

Guiding Eyepiece



Recommended Astrophoto Outfit

Here's a sample setup based around proven equipment we've used and can recommend. The core is a short-focus 80mm to 100mm apo refractor on a solid but portable German equatorial mount. For guided deep-sky photography, you must add essential accessories, often from a variety of suppliers.

Mounting Rings

Vixen-standard dovetail plate and 80mm rings (William Optics, ADM or Losmandy). Approx. \$150.

Main Scope

A Sky-Watcher Equinox 80ED, but there are many choices, most f6 to f7. \$600 to \$2,000.

Field-Flattener/Adapter

Includes camera-adapter ring. This is a Borg #7887; similar units are available from Tele Vue and William Optics. \$150 to \$300.

Focuser Extension Tube
Allows guide camera to reach focus straight through (Lumicon). Approx. \$30.

Astrophoto-Capable German Equatorial Mount

We like the Sky-Watcher HEQ5 for low-cost yet good tracking, GoTo and auto-guiding capability (aka Orion Sirius). Add heavy or extra counterweight for balance. Approx. \$1,200.

USB-to-Guider-Port Adapter

For guider cameras with no auto-guider port; translates guide pulses from laptop's USB to mount's guider jack (Shoestringastronomy.com). Approx. \$80 with cables.

Laptop (Mac or PC)

For running auto-guiding software such as PHD Guider (can be older, slower machine). No cost if you already have one.

Guidescope

A 66mm William Optics model; similar models are available in other brands. A solid focuser is essential. Approx. \$300.

Guidescope Rings

To bolt securely onto the 80mm tube rings, with adjustable centering bolts (William Optics, Losmandy or ADM). Approx. \$100.

Guiding Camera

Low-cost CCD camera, like Meade DSI or Orion Guider, is best for picking up faint guide stars. \$200 to \$400.

DSLR

As of early 2019, a Canon 400D (EOS Rebel T1i) is a good filter-mounted choice. A Canon 200D (EOS Rebel T7) is a good optional choice. Approx. \$1,200 to \$1,500.

Camera Remote

Fires shutter through programmed exposure sequences. Very nice to have. Approx. \$200.

Not Shown:

- High-capacity battery(s) for power mount and laptop in the field.
- Extra batteries or external power supply for DSLR.
- Field table and chair.
- Image-processing software.
- Spousal approval!

Astrophotography Autoguiding

PHD2

PHD2 is guiding software inspired by Stark Labs PHD Guiding. PHD2 is free of cost, open source, and community-developed and supported.

Download v2.6.9 for Windows | **Download v2.6.9 macOS 64-bit**

Home | Learn More | News | Changelog | Download | Documentation | Getting Help | About

Open PHD Guiding – Official Website for PHD2

PHD2 is telescope guiding software that simplifies the process of tracking a guide star, letting you concentrate on other aspects of deep-sky imaging or spectroscopy.

Latest News
PHD2 v2.6.9 Released
Head to [Downloads](#) for the installation files and release details.

PHD2 Best Practices
Bruce and Andy have compiled a list of best practices for PHD2. These aren't "must-dos", but they represent lessons learned from both personal experience and from analyzing hundreds of log files covering a wide range of equipment configurations. Updated Dec 2019.

[Download PDF: English Français Italiano](#)

PHD2 Log Viewer - PHD2_GuideLog_2020-09-07_211849.txt - PHD2 2.6.9 [Windows]

File Help

Log sections

1	2020-09-07 21:23:50	Calibration	
2	2020-09-07 21:24:33	Guiding	23m50s
3	2020-09-07 22:19:12	Guiding	53m11s

Section heading

Guiding Begins at 2020-09-07 22:19:12

Equipment Profile = asi120mm
 Dither = both axes, Dither scale = 1.000, Image noise reduction = 2x2 mean, Guide-frame time lapse = 0, Server enabled
 Pixel scale = 3.87 arc-sec/px, Binning = 1, Focal length = 200 mm
 Search region = 15 px, Star mass tolerance = 50.0%
 Camera = ZWO ASI120MM Mini, gain = 48, full size = 1280 x 960, no dark, no defect map, pixel size = 3.8 um
 Exposure = 1500 ms
 Mount = CPWL_ASCOM_Telescope, connected, guiding enabled, xAngle = -118.0, xRate = 2.023, yAngle = 152.4, yRate = 2.845, parity = -/
 Norm rates RA = 11.67/s @ dec 0, Dec = 12.27/s; ortho err. = 0.4 deg
 X guide algorithm = Hysteresis, Hysteresis = 0.100, Aggression = 0.700, Minimum move = 0.190
 Y guide algorithm = Resist Switch, Minimum move = 0.190 Aggression = 100% FastSwitch = enabled
 Backlash comp = disabled, pulse = 20 ms

2020-09-07 22:42:00 Frame 759 t=1368.44 (x,y)=(-0.01,0.11) (RA,Dec)=(-0.09,0.06) guide(0.00,0.00) corr(0,0) m=4033 SNR=43.0

Plot options

Device: Mount AO
 Units: arc-sec pixels
 Axes: RA/Dec dx/dy
 Corrections RA Star mass Events Scatter
 Grid Dec SNR Limits

Statistics

	RMS	Peak
RA	0.78" (0.20 px)	-2.92" (-0.75 px)
Dec	0.41" (0.11 px)	2.11" (0.55 px)
Total	0.88" (0.23 px)	

Controls

- Align Frames
- FWHM Filter
- Brightness Filter
- Auto Save on Clear/C

Raw Frames

View

Stacking

Settings

Trendlines

Corrections

RA Dec

RMS Error [px]:
 RA 0.16 (0.62")
 Dec 0.07 (0.27")
 Tot 0.17 (0.67")
 RA Osc: 0.23

RA: Agr 70 Hys 10 MnMo 0.19 DEC: Agr 100 MnMo 0.19

Scope: Mx RA 2500 Mx DEC 2500 Auto

minutes total exposure

The reason to *AUTOGUIDE*: long duration exposures –

30s

60s

180s

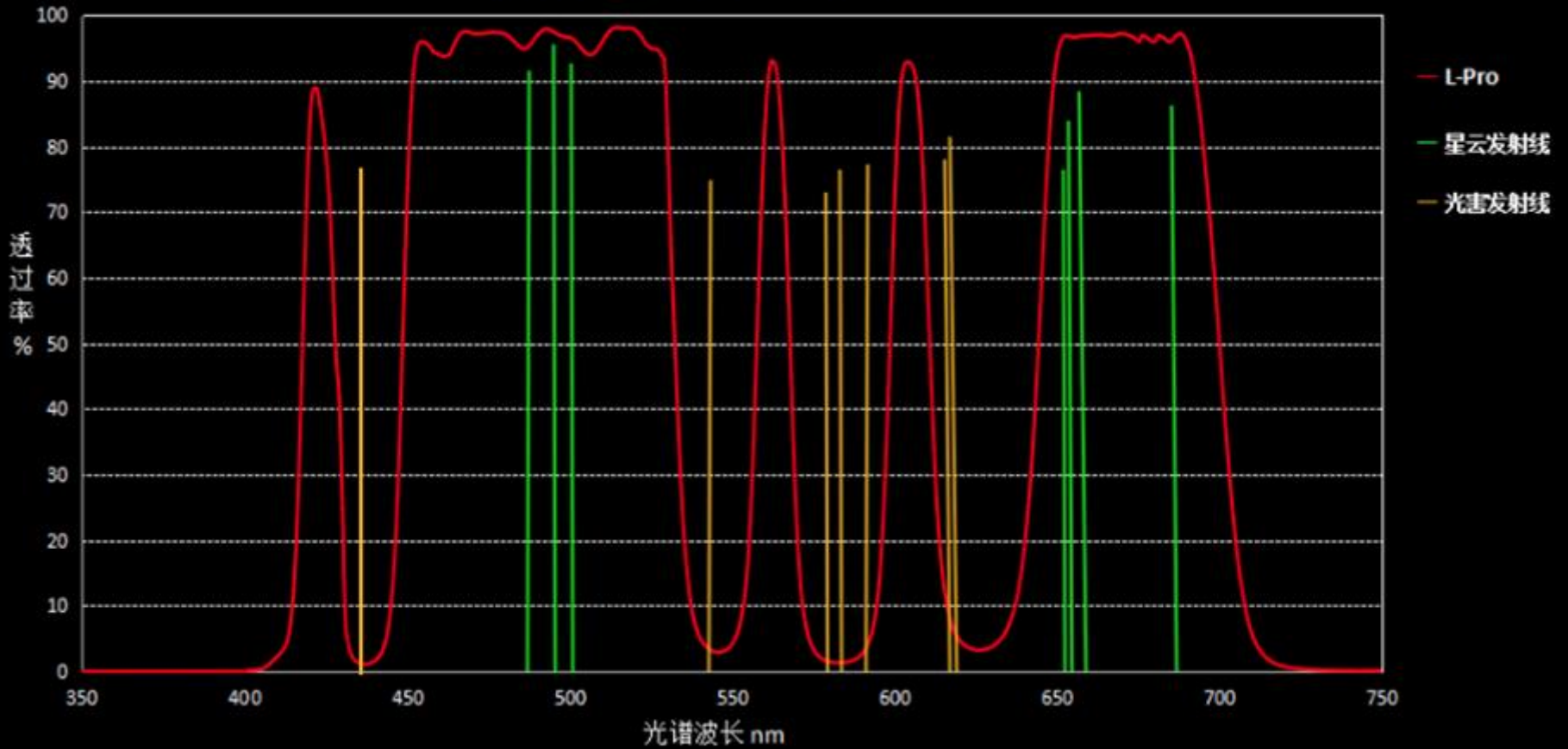
240s



NGC 7009



OPTOLONG® L-Pro Filter



Caroline's Rose



Tilt-Shift Photo of Andromeda Wins Astronomy Photographer of the Year

The Royal Observatory Greenwich unveiled the winners of the coveted 2020 Astronomy Photographer of the Year awards.

HDR astrophotography by Nicolas Lefaudeux

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'The Prison Of Technology'



Rafael Schmall

Dark and Quiet Skies for Science and Society

On line

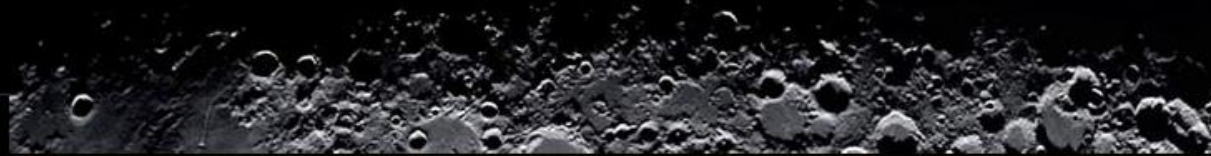
5 - 9, October, 2020



UNITED NATIONS
Office for Outer Space Affairs



INTERNATIONAL
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UNION



Mars Section

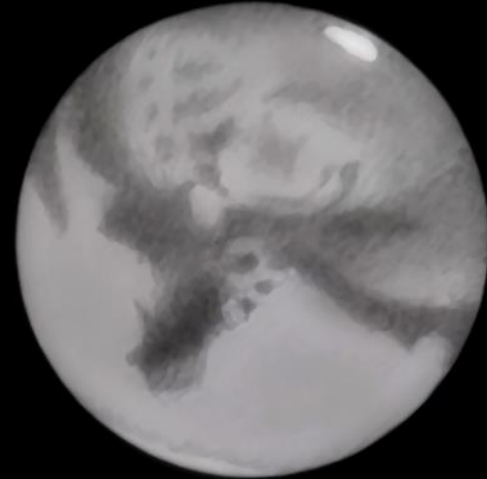


SEPTEMBER 30th, 2020
00:10 UTC

SEPTEMBER 30th, 2020
00:36:54 UTC

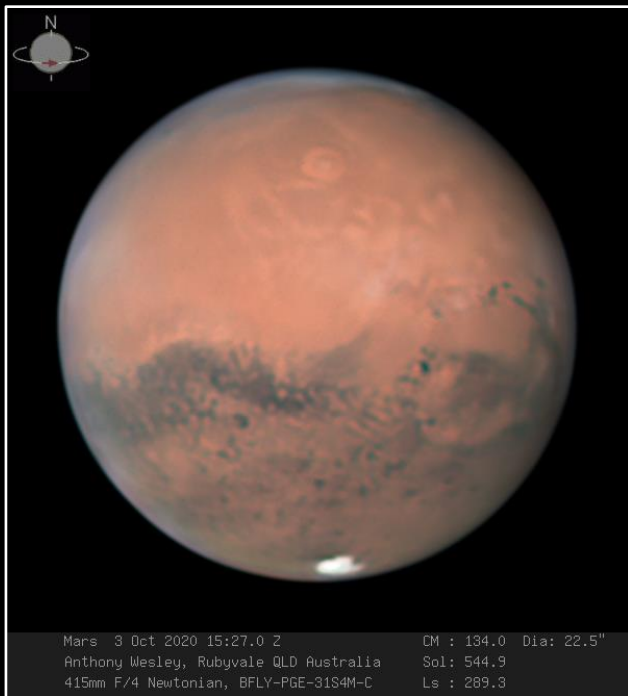


Damian Peach



Diam: 22.4"

Celestron C14 Edge HD @ 400x. IL & W21,25 filters.
Seeing: Excellent (Pickering 8-9)
Trans: Good (5.0mag, occ low cloud, high haze) Heavy dew
Wind SW - 5-15kts.
Diam: 22.4"



Anthony Wesley



Christopher Go



Stephenson 2-18

Radius:
2,150 x Sun

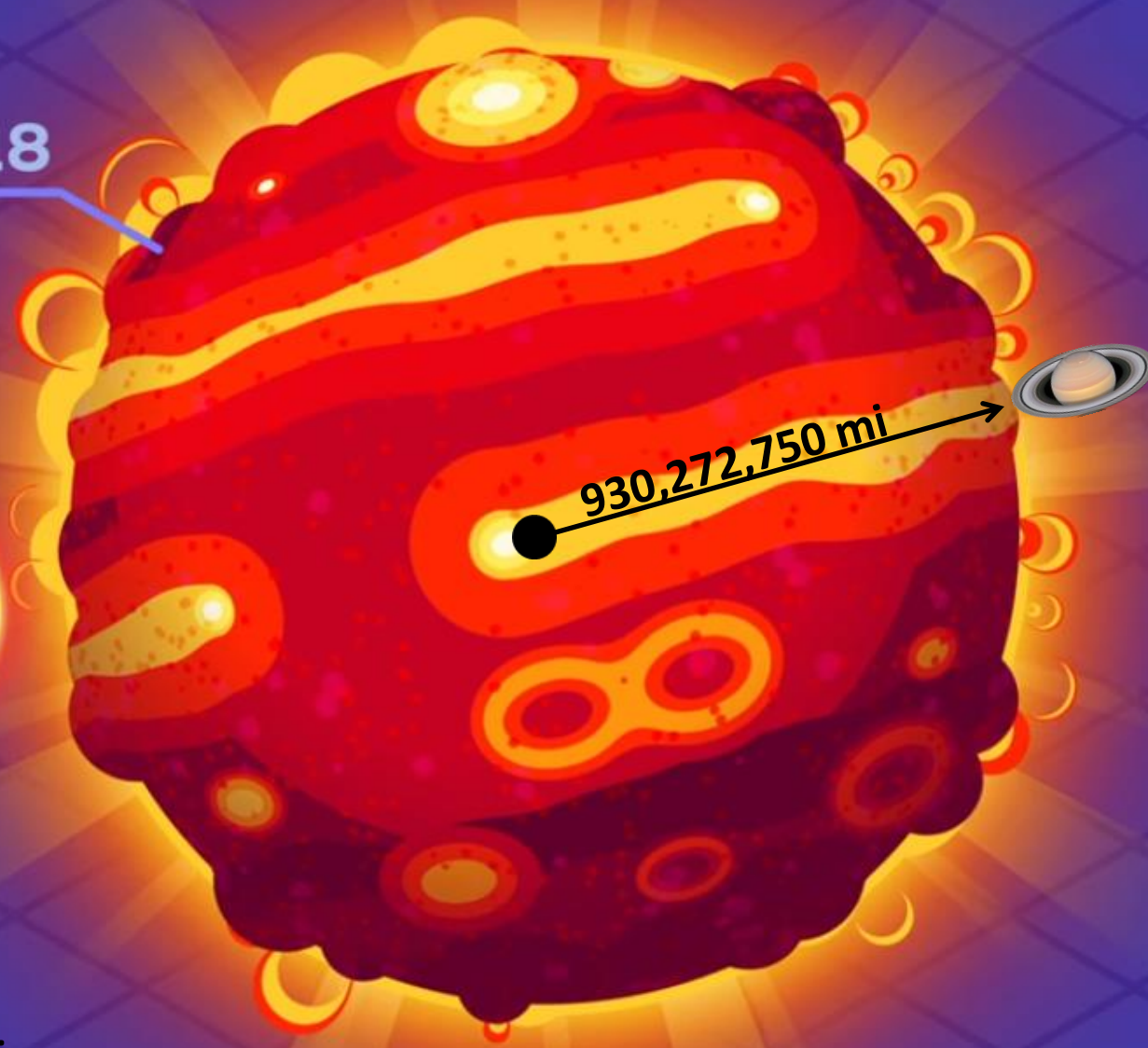
Rho Cassiopeia

500x

930,272,750 mi

Sun Radius = 432,685 mi

Rho Radius = 216,342,500 mi (halfway to Jupiter)



Type: **star**
Magnitude: **15.55** (extincted to: **15.78**)
Color Index (B-V): **2.27**
RA/Dec (J2000.0): 18h39m5.82s/-6°02'49.9"
RA/Dec (on date): 18h40m13.61s/-6°01'38.7"
Hour angle/DE: 2h09m43.81s/-6°00'19.8" (apparent)
Az/Alt: +219°50'24.4"/+33°38'23.3" (apparent)
Ecliptic longitude/latitude (J2000.0): +280°10'14.3"/+17°02'51.6"
Ecliptic longitude/latitude (on date): +280°27'54.1"/+17°02'40.6"
Ecliptic obliquity (on date): +23°26'12"
Galactic longitude/latitude: +26°08'44.9"/-0°01'23.0"
Mean Sidereal Time: -3h9m58.6s
Apparent Sidereal Time: -3h9m59.7s

Saturn

Jupiter



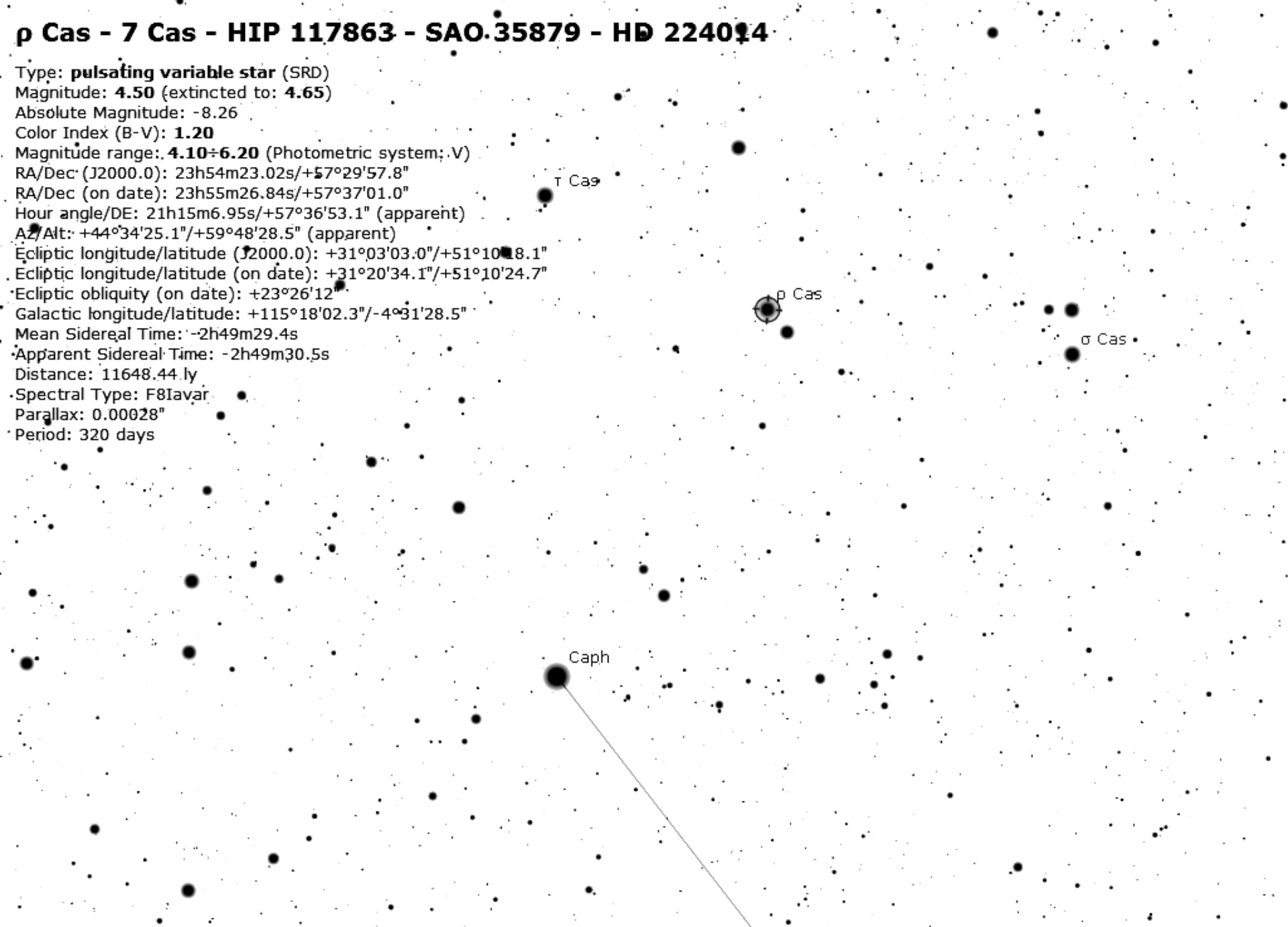
ρ Cas - 7 Cas - HIP 117863 - SAO 35879 - HD 224014

Type: **pulsating variable star** (SRD)
Magnitude: **4.50** (extincted to: **4.65**)
Absolute Magnitude: -8.26
Color Index (B-V): **1.20**
Magnitude range: **4.10+6.20** (Photometric system: V)
RA/Dec (J2000.0): 23h54m23.02s/+57°29'57.8"
RA/Dec (on date): 23h55m26.72s/+57°37'00.3"
Hour angle/DE: 20h56m20.86s/+57°36'54.7" (apparent)
Az/Alt: +45°28'10.2"/+57°20'20.6" (apparent)
Ecliptic longitude/latitude (J2000.0): +31°03'03.0"/+51°10'18.1"
Ecliptic longitude/latitude (on date): +31°20'32.1"/+51°10'24.7"
Ecliptic obliquity (on date): +23°26'12"
Galactic longitude/latitude: +115°18'02.3"/-4°31'28.5"
Mean Sidereal Time: -3h8m16.1s
Apparent Sidereal Time: -3h8m17.2s
Distance: 11648.44 ly
Spectral Type: F8Iavar
Parallax: 0.00028"
Period: 320 days



ρ Cas - 7 Cas - HIP 117863 - SAO 35879 - HD 224014

Type: **pulsating variable star** (SRD)
Magnitude: **4.50** (extincted to: **4.65**)
Absolute Magnitude: -8.26
Color Index (B-V): **1.20**
Magnitude range: **4.10÷6.20** (Photometric system: V)
RA/Dec (J2000.0): 23h54m23.02s/+57°29'57.8"
RA/Dec (on date): 23h55m26.84s/+57°37'01.0"
Hour angle/DE: 21h15m6.95s/+57°36'53.1" (apparent)
AZ/Alt: +44°34'25.1"/+59°48'28.5" (apparent)
Ecliptic longitude/latitude (J2000.0): +31°03'03.0"/+51°10'18.1"
Ecliptic longitude/latitude (on date): +31°20'34.1"/+51°10'24.7"
Ecliptic obliquity (on date): +23°26'12"
Galactic longitude/latitude: +115°18'02.3"/-4°31'28.5"
Mean Sidereal Time: -2h49m29.4s
Apparent Sidereal Time: -2h49m30.5s
Distance: 11648.44 ly
Spectral Type: F8Iavar
Parallax: 0.00028"
Period: 320 days



If you are one of these top (3) teams please have ONE person from your team email to jennifer_gilcreast@wgbh.org to organize the receipt of your prize.

A full ranking of all teams is below.

Participant	Score
Ken	2201
CM	2114
Newton North 07	2019
That's what she said	2014
Low Key Losers	1723
SSASTROS	1713
David & Carla	1684
Courtney	1607
The Hummels	1558
BRC Hydrophiles	1549



Sex^{mo} Princeps.

Galileo Galilei Humilis. Servo della Ser.^a V.^a inuigilando assiduamente, et de ogni spirito p^o potere no solam^e satisfare alcarico che tiene della lettera di Mathematici nello studio di Padoua,

Scrive d'auere determinato di presentare al Sex^{mo} Princeps l'Vchiale et il p^o essere di giuramento inestimabile p^o ogni negozio et impresa marittima o terreste stimo di tenere questo nuovo artificio nel maggior segreto et solam^e a disposizione di S.^a Ser.^a L'Vchiale canato dalle piu uide speculazioni di prospettiva ha il uantaggio di scoprire Legni et Vele dell'inimico p^o due hore et piu di tempo prima ch'egli sia sopra noi et distinguendo il numero et la qualita de i Vasselli giudicare le sue forze pallearsi alla caccia al combattimento o alla fuga, o pure anco nella capogna aperta uedere et particolarmente distinguere ogni suo uoto et preparamento.

Apr. 7. di Gennaio

Gione si uede a 7

Adi 8 a 7

4 ora dug^o diretto et no retrogrado

Adi 12. si uede in tale costituzione

Il 13. si uede in uicini^e a Gione 4 stelle

Adi 14 è uigilia

Il 14 * * * * * la pross^a a 7 ora la mig^a la 4^a ora di-

stante dalla 3^a il doppio l'area

Lo spazio delle 3 aude^o tali no om

maggior del diametro di 7 et e-
rauo in linea retta.



Observationes Ieruitan^e

20. Ibris

mar H. 12

○ * *

30. mane

* * ○ *

2. Xbr:

○ * * *

3. mane

○ * *

3. Ho. 5.

* ○ *

4. mane

* ○ * *

6. mane

* * ○ *

8. mane H. 13.

* * * ○

10. mane

* * * ○ *

11.

* * ○ *

12. H. 4 uesp:

* ○ *

13. mane
































* * ○ *

14. mane

* * * ○ *

2020 SEPTEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
Channeling Galileo		1x CLOUDY	2x CLOUDY	3v P 7:05pm M 7:20pm MOSTLY CLOUDY	4v P+M 7:30pm CLEAR	5v P+M 7:45pm CALLISTO IN SUP. SHADOW
6v P-7:05pm, M-2:15 MOSTLY CLOUDY	7v P+M 7:20pm PARTLY CLOUDY	8v P, GRS, SHADOW, G I SHADOW 11:10pm GRS 8:25pm E+C 7:20pm MOSTLY CLOUDY	9x CLOUDY	10v P+M 7:50pm T-STORMS COMING, INSANELY SHORT WINDOW, CALLISTO NOT SEEN. *	11v P+GRS: 6:55pm M+SHADOW-7:40 CLEAR	12v P+M 8:15pm PARTLY CLOUDY
13v P+GRS-7:00pm M-8:4pm CLEAR	14v P-6:55pm M-7:40pm WILDFIRE SMOKE IMPACT!	15v P, 3M, GRS 8pm SMOKE HUGE, NEM 1.0!	16v P+3M 7:30pm (I IN SHADOW) STILL SMOKE!	17x CLOUDY	18v P+4M 7:20pm CLEAR, 1/5 SEEING.	19v P+4M 8:00pm CLEAR, VARIABLE SEEING
20v P, 3M, GRS 7:45 CLEAR, S 2/5	21v P, 4M 7:45 CLEAR, S 2/5	22v P+4M 7:30 MOSTLY CLOUDY	23v P+3M 7:15 I IN OCCULTATION.	24v P+4M 8:00 THROUGH CLOUDS.	25v P, 4M, GRS 7pm @ PLY. HARBOR EVENT	26v P, 3M 7pm MOSTLY CLDY - S 3/5
27v P+3M, GRS 8:30 MOSTLY CLOUDY	28v P+4M 7:45 MOSTLY CLOUDY	29v P+4M 7:05 BRIEF WINDOW, CLOUDY	30v P, 4M, GRS-6:45 CALLISTO SHADOW 9:15 CLEAR, S 1/5	OBSERVED PLANET+MOONS ON 26/30 EVENINGS, SAW GRS 11 TIMES AND MOON SHADOWS 5 TIMES. A record of Jupiter's Moons ALL RECORDS SHOWN 1/2 REVERSED (REFRACTOR w/DIAGONAL)		

MONTH	DAY	YEAR	TIME	RECORD OF MOON POSITIONS
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				

Very Convenient Jupiter Moon Shadow Transits

September Evenings, 9pm Local Time

8th - Io ✓ 7:10pm, 102F11, 3 $\frac{3}{5}$,
T $\frac{2}{5}$, 9mm/122x - NICE!

11th - Europa ✓ 7:40pm, JUST STARTING -
102F11, 9mm, 122x,
S $\frac{2}{5}$, T $\frac{3}{5}$, - SHARP!

15th - Io ✓ 9:20pm, 102F11, 9mm/122x
T $\frac{1}{5}$, S $\frac{3}{5}$ - WILDFIRE SMOKE!

19th - Ganymede ✓ 7:30 - 9:10pm, 6" F9, 102F11
S $\frac{2-3}{5}$, T $\frac{3}{5}$ - SUPER OBVIOUS!

30th - Callisto...bonus!

The moon and Mars

Friday, October 2nd

On Friday night, Oct. 2, the moon, just one day past its "[Harvest Full Moon](#)" phase, will appear to glide closely above the planet Mars.

This dance will be a near facsimile of another close moon-Mars approach which took place less than a month ago on Sept. 5. That time, Mars and the moon approached each other a bit more closely than the upcoming rendezvous. But as if to compensate, this time Mars will appear twice as bright.

That's because Mars is only days away from making its closest approach to Earth on Oct. 6, while arriving at its [best opposition until 2035](#) on Oct. 13. Both conditions mean the planet is now shining prominently with a dazzling yellow-orange glow.

Skywatchers located in Patagonia, the sparsely populated region at the southern end of South America, will actually see the moon hide Mars for a short time. (The International Occultation Times Association offers a [map of visibility](#) and more details about this "Mars eclipse." The same region will catch a [total eclipse of the sun](#) on Dec. 14.)









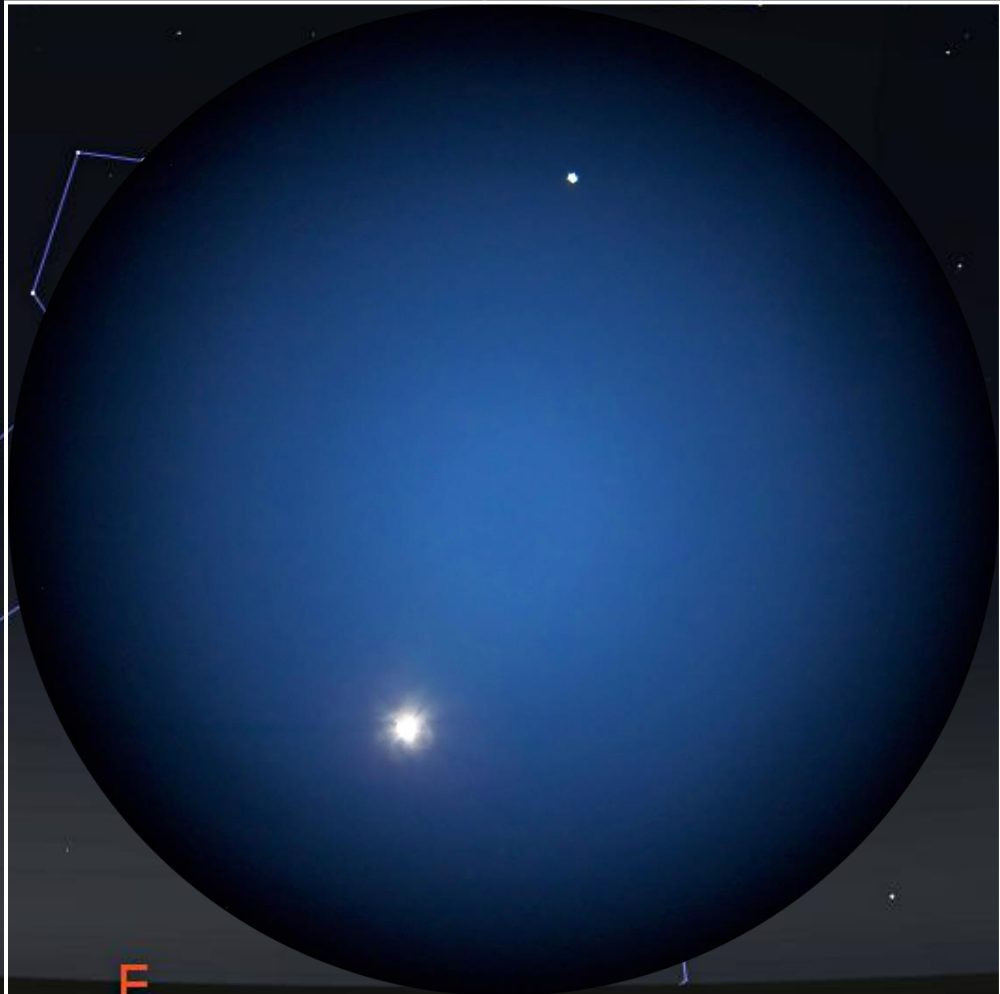
Schinn
Lighthouse

ALL RIGHTS
RESERVED

NO
SMOKING

Venus

Type: planet
Magnitude: -4.09 (extincted to: -3.79)
Absolute Magnitude: -27.34
RA/Dec (J2000.0): 9h56m35.61s/+12°46'09.7"
RA/Dec (on date): 9h57m43.75s/+12°40'07.0"
Hour angle/DE: 19h32m18.58s/+12°41'28.3" (apparent)
Az/Alt: +95°52'59.4"/+25°32'39.6" (apparent)
Ecliptic longitude/latitude (J2000.0): +146°51'11.2"/+0°13'13.4"
Ecliptic longitude/latitude (on date): +147°08'52.2"/+0°13'18.9"
Ecliptic obliquity (on date): +23°26'12"
Galactic longitude/latitude: -136°34'55.1"/+46°44'04.5"
Mean Sidereal Time: 5h29m56.9s
Apparent Sidereal Time: 5h29m55.9s
Distance: 1.069AU (159.859 Mio km)
Apparent diameter: +0°00'15.6"
Sidereal period: 224.70 days (0.615 a)
Sidereal day: 5832h28m47.1s
Mean solar day: 2802h0m52.2s
Phase Angle: +64°41'50"
Elongation: +40°33'15"
Phase: 0.71
Illuminated: 71.4%



Date and Time [X]

Date and Time			Julian Day						
2020	/	9	/	30	5	:	35	:	10

South Shore Astronomical Society

Since 1958

Observing Objectives – October '20



A sampling of some rewarding night-sky treats for this month:

Open Cluster – (2)

Globular Cluster

Double Star – (8)

Planetary Nebula – (1)

Galaxy – (6)

See the *Andromeda Constellation Guide*

Comets – Need a comet fix? Try 88P Howell.

Mercury – Terrible apparition this month. If desperate, try high-noon.

Venus – Getting both bigger and smaller at the same time; 80%, 13.2" by the 31st.

Mars – Reaches max diameter (22.6") from 3rd to 9th, opposition on the 13th.

Jupiter – Never seen the Great Red Spot? Click [here](#) to find out when you can.

Saturn – Do outreach, hear people say "that's fake, you put a picture in there".

By Day: The Sun – rising from its slumber of minima lately, maybe.

Notable Dates: Full Moon – 10/1 New Moon – 10/16 Blue Moon – 10/31

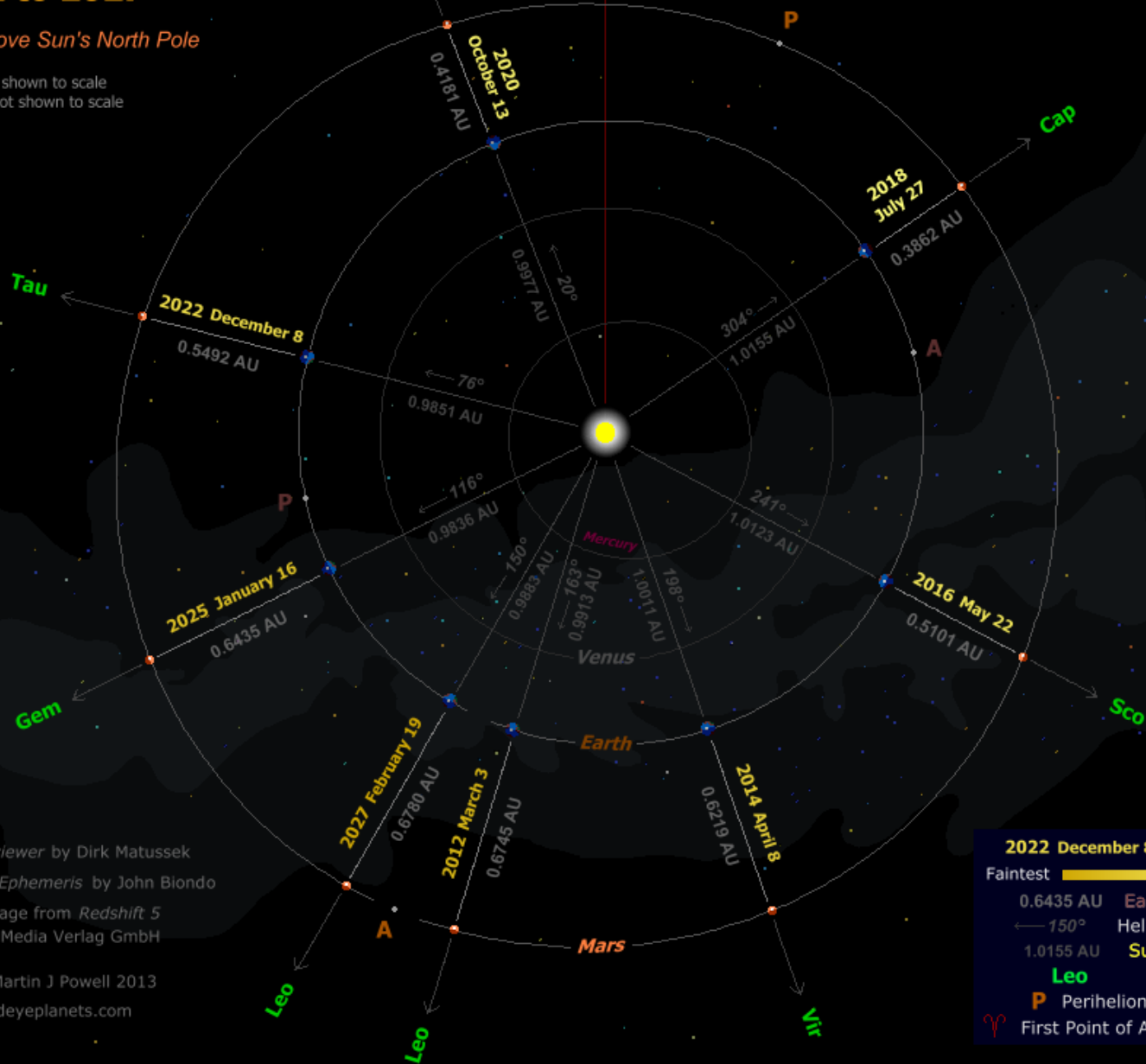
Mars Oppositions

2012 to 2027

View from above Sun's North Pole

Orbits shown to scale
Planets not shown to scale

1 Astronomical Unit (AU) = 92,955,806 statute miles
= 149,597,870 kilometres



Orbits from *Astroviewer* by Dirk Matussek
Data from *SkyGazer Ephemeris* by John Biondo
Background image from *Redshift 5*
by United Soft Media Verlag GmbH

Diagram © Martin J Powell 2013
www.nakedeyepianets.com

2022 December 8 Opposition date

Faintest Brightest

0.6435 AU Earth-Mars distance
← 150° Heliocentric longitude
1.0155 AU Sun-Earth distance


Leo Constellation
P Perihelion **A** Aphelion
♈ First Point of Aries (Vernal Equinox)

Mars Oppositions – 2018 to 2037

DATE	SIZE (ARC SEC)	CONSTELLATION	CULMINATION (DEGREES)
07/27/18	24.3"	Capricornus	22*
10/13/20	22.4"	Pisces	53*
12/08/22	17.1"	Taurus	73*
01/16/25	14.5"	Gemini	73*
02/19/27	13.8"	Leo	63*
03/25/29	14.4"	Virgo	49*
05/04/31	16.8"	Libra	32*
06/27/33	21.9"	Sagittarius	20*
09/15/35	24.5"	Aquarius	40*
11/19/37	18.8*	Taurus	68*

S Mars Profiler - Google Chrome

skyandtelescope.org/wp-content/plugins/observing-tools/mars_profiler/mars.html



Mars Profiler

This map depicts the Martian hemisphere facing Earth for the entered date, time, and telescope type. The red circle indicates the region of Mars pointed directly toward us.

Date: Time: UT
(mm/dd/yyyy)

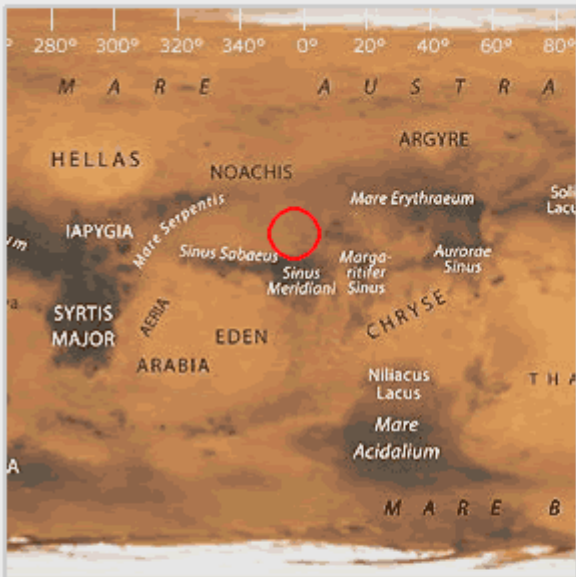
Time-zone offset from UT in hours (from your Web browser):

Telescope type: **Inverted view**

Direct view
(Erect-image system)

Inverted view
(Newtonian / Dobsonian)

Mirror reversed
(SCT/Mak/refractor + diagonal)



Map showing Martian regions: HELLAS, NOACHIS, ARGYRE, IAPYGIA, SYRTIS MAJOR, AERIA, EDEN, ARABIA, CHRYSE, THARSIS, MARE ACIDALIUM, MARE ERYTHRAEUM, SINUS MERIDIANI, SINUS SABAEUS, MARGARITIFER SINUS, AURORAE SINUS, NILIACUS LACUS.

Basic Data about Mars for telescopic observers:

Apparent visual magnitude: <input type="text" value="-2.6"/>	Angular diameter (arcsec): <input type="text" value="22.6"/>
Distance from Earth (a.u.): <input type="text" value="0.41"/>	Elongation from the Sun (°): <input type="text" value="169"/>
Illumination (%): <input type="text" value="100"/>	Central-meridian longitude (°): <input type="text" value="356"/>
Position angle of north pole (°): <input type="text" value="325"/>	Opposition 2020 countdown (days): <input type="text" value="7"/>

Circlet

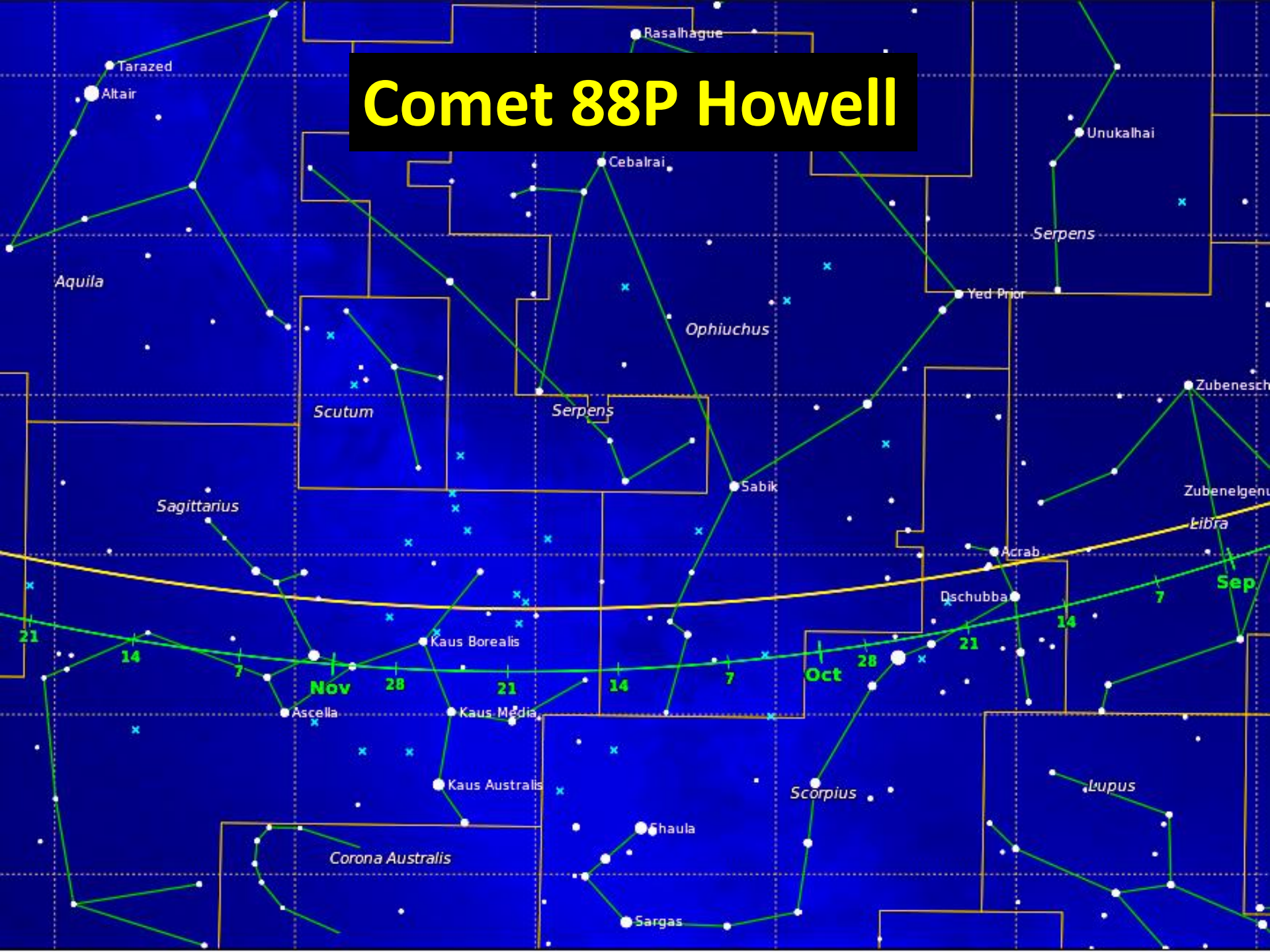
Neptune in October

Binocular field of view



Psi 1,2,3

Comet 88P Howell





Club Business



Duxbury COA Request

**Zoom Presentation –
topic and date TBD**

Physical Outreach:

Friday, October 23rd

6:30 – 8:30pm

Need Volunteers...

Safety Protocols





Club Business





Club Business



An Evening with the South Shore Astronomical Society

Friday October 23rd 6:30-8:30pm

Come to the Duxbury Senior Center parking lot for the opportunity to see some beautiful celestial sights as never before!!

Volunteers from the SSAS will set up large telescopes that will enable us to see the moon, Jupiter, Mars and more.

Please note, this program is weather dependent. Notice will be sent out ASAP if the program is unable to be held due to inclement weather.

** To register for this program please email programs@duxburycoa.com a confirmation will be sent in turn along with covid guidelines for attending the event.



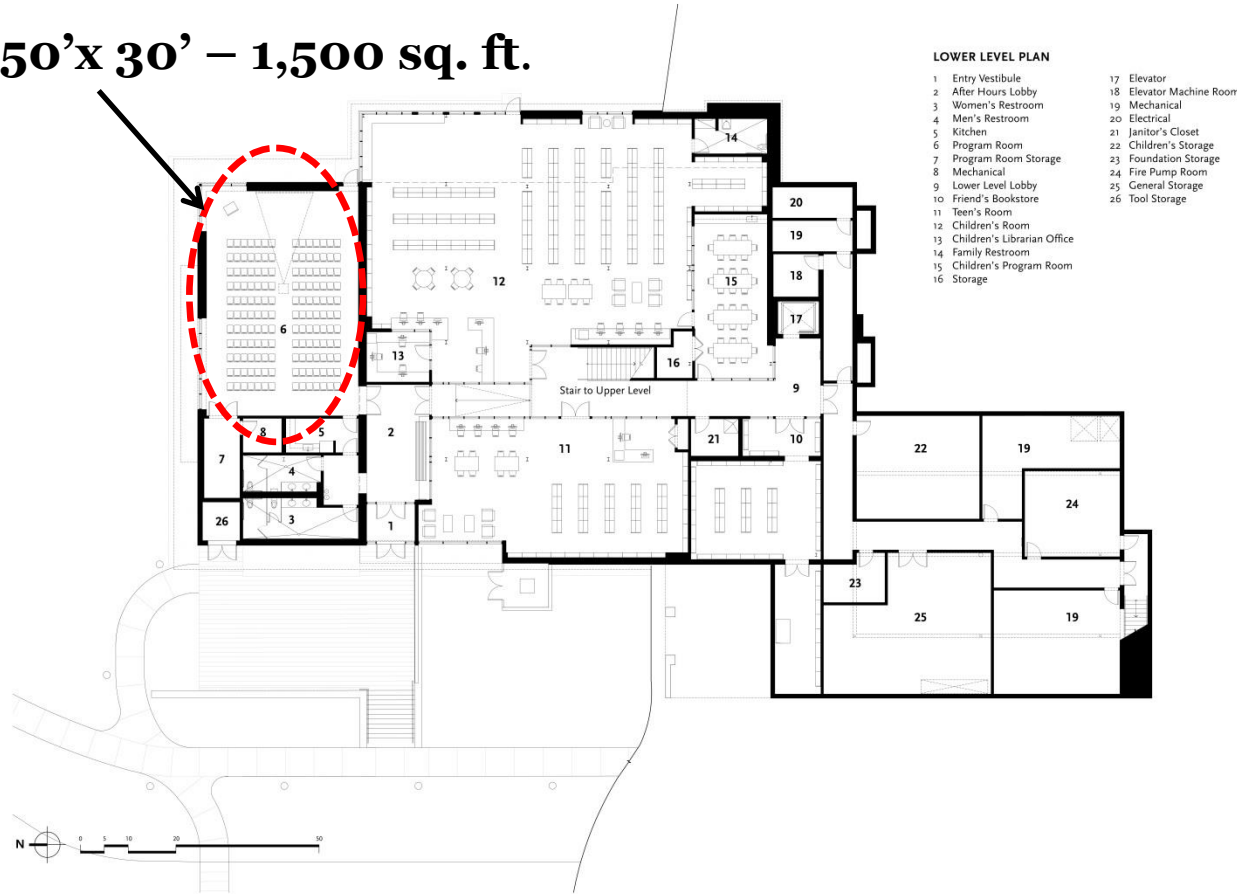
Hot chocolate and coffee will be available to help keep us warm!



Club Business

- Why we (sort of) love Zoom...

50'x 30' – 1,500 sq. ft.



Massachusetts
Phase 3, Stage 2
Reopening:

25ppl indoors,
8/1000 sq. ft.

Library
Community Rm.
Capacity:

Pre-CoVid, 150

Current – **12**

Clear Skies!

